

creased later during growth. A decline was found at the time of flowering and fruiting. In terrestrial plants a decrease in concentration before leaf fall is quite common.

Potassium content was very low in the beginning as plants regenerated but at or before maturity this amount increased considerably. At the time of regeneration the ash content was found quite low. No correlation was found between the chemical contents of plants and the surrounding water.

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36. STUDIES IN CYPERACEAE IV. NOTES ON *SCLERIA RUGOSA* R. BR. AND ITS COMPLEX

(With a plate)

Among the specimens of Cyperaceae received for study from the Herbarium of the Forest Research Institute, Dehra Dun (DD), was an interesting specimen which can be identified as *Scleria rugosa* R. Br. This taxon in herbariums is usually mis-identified as *S. levis* Retz., *S. zeylanica* Poir., *S. thwaitesiana* Boeck. or *S. flaccida* Clarke. This confusion pertaining to the identity of all the concerned species within this complex is understandable partly in the light of the basic mis-interpretation which is evident from the synonymies and the description given for *S. zeylanica* and *S. flaccida* and partly due to the fact that

S. rugosa is supposed to be an Australian species (C.B. Clarke, in Hook. f. Fl. Br. Ind. 6 : 688, 1894). As far as *S. rugosa* R. Br. is concerned, it is said to be unknown in India and clearly stated to be an Australian species by Clarke (loc. cit.). However, a presumed relative of this species known as *S. flaccida* Clarke has been described which according to him may perhaps be considered as a variety of the Australian species.

C. B. Clarke (loc. cit.) further points out that *S. flaccida* Clarke and *S. rugosa* R. Br. may be distinguished mainly on the basis of the nut characters which in the former is smooth and non-apiculate while in the latter it is reticulated, subtuberculated and apiculate. It works well as long as the characters remain quite contrasting and divergent but in reality, these presumed differences do not hold good because the nuts as they undergo maturation exhibit certain progressive exomorphic changes corresponding with the degree of their maturation. I could very well observe this in one and the same specimen (*Deshpande* 5, DD). When the nuts are still young and immature, they appear smooth, and polished ; slightly older nuts show obscure superficial depressions especially in the upper half thereby becoming somewhat lacunose (Fig. e) ; when the nuts that are in the early stages of development get pressed during the curatorial processes, they tend to develop wrinkles and folds thereby assuming rugose or rugulose or subtuberculated condition which seems to be an artefact. During all these stages of development, the colour of the nut continues to be white sometimes changing to pale white. On the other hand, when the nuts become fully mature, not only the colour of the nut ultimately changes over to plumbeous or black with three dark bands (Figs. c, d) but the abovementioned surface sculpturings and artefacts totally disappear and thus become smooth and also in this stage they are covered by several dull brown patches (Figs. c, d). Disc consists of three distinct spreading lobes (Fig. f) when nuts are young while in the mature nuts, each lobe becomes reflexed (Fig. d). In the light of these facts, it is futile and unreliable to give emphasis to this changing character of the nut and employ it for circumscribing the species. But for this undependable character, there is no other character available to differentiate satisfactorily *S. flaccida* from *S. rugosa* and since the former happens to be a younger binomial and superfluous it is to be treated as a synonym of *S. rugosa* R. Br. (*vide* ICBN, Art. 63, 1961). Furthermore, it is invalidated because the binomial *S. flaccida* Clarke is a later homonym (*vide* ICBN, Art. 64, 1961).

According to Hooker (in Trim. Handb. Fl. Ceyl. 5 : 597, 1900) there are three forms of *S. zeylanica* Poir., in Herb. Peraden. under Nos. C. P. 3318, 3796 and 3797. Out of these three forms, C. P. 3797 becomes the type of *S. thwaitesiana* Boeck. *S. zeylanica*

(non Poir.) Clarke, Fl. Br. Ind. 6 : 687 *pro parte, quoad specim.* C.P. 3797 and C. P. 3796 is the type of *S. lateriflora* Boeck. which is conspecific with *S. rugosa* R. Br. but wrongly cited by Clarke (loc. cit.) under *S. zeylanica* Poir. Thus, it is clear that the so-called *S. zeylanica* Poir. *sensu* Clarke represents a combination of two distinct species (*S. thwaitesiana* and *S. rugosa*) but each one has got nothing to do with the other. In other words, *S. zeylanica* Poir. *sensu* Clarke embraces both *S. thwaitesiana* Boeck. and *S. rugosa* R. Br. (*S. lateriflora* Boeck.) as could be seen from the synonymies and description. As pointed out by S. T. Blake (J. Arnold Arb. 35 : 226, 1954), *S. zeylanica* Poir. is in reality not only a synonym of *S. levis* Retz. but becomes totally different from both *S. thwaitesiana* Boeck. and *S. rugosa* R. Br. In the light of these considerations, it is considered that both *S. flaccida* Clarke and *S. lateriflora* Boeck. are conspecific with *S. rugosa* R. Br.

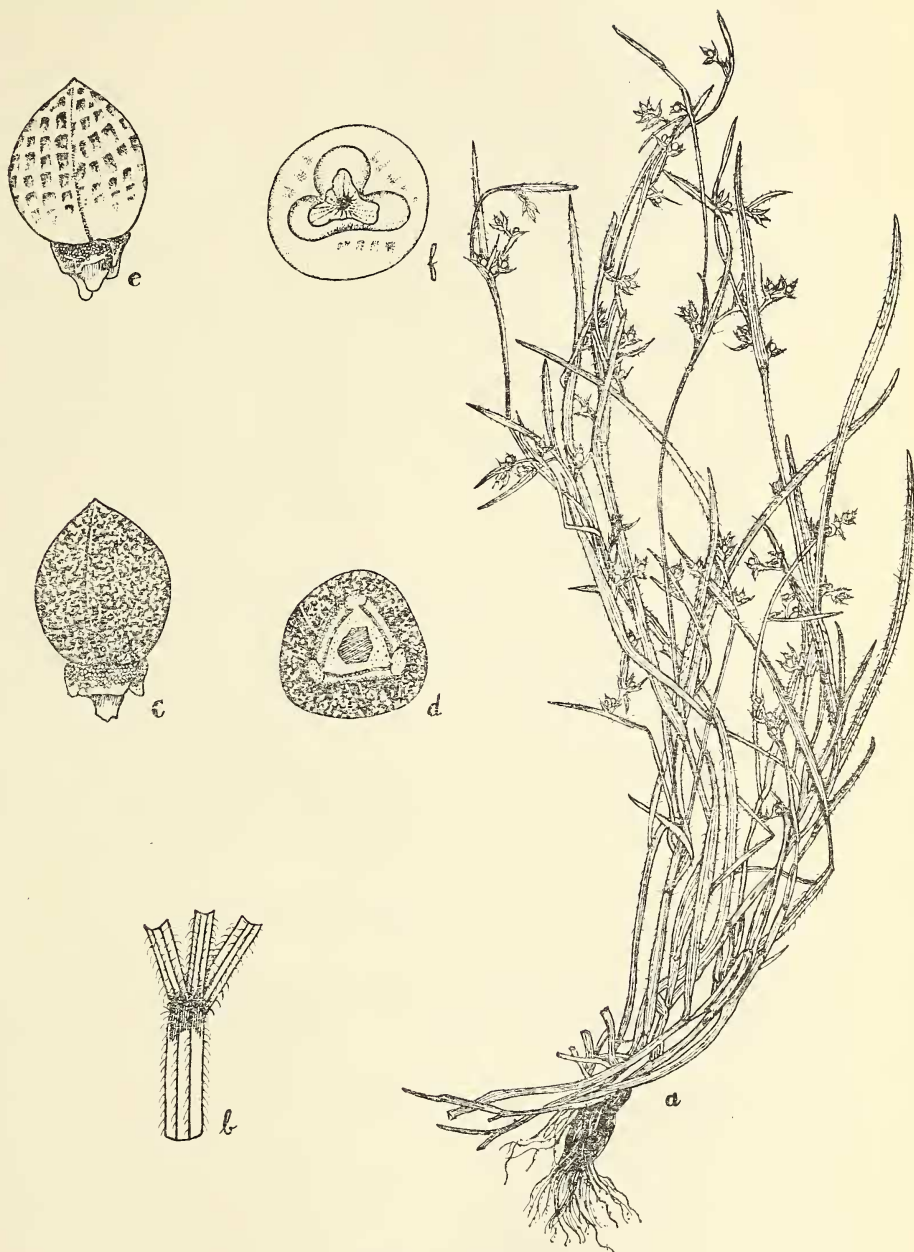
As far as the distribution of *S. lateriflora* is concerned, it occurs rather commonly in moist low country below c. 333 m (Kukul ?) Korale, Ratnapura, Hewawisse (not Hewesse), in S. Ceylon and flowers in April and July while *S. flaccida* Clarke is available in Assam and Pegu. *S. rugosa* R. Br. is said to be widely distributed in Ceylon and India without indication to specific locality, contrary to what has been said by Clarke (loc. cit.) (Kern, Blumea, 9 : 207, 1961). But in this connection, it is interesting to note that the specimen (*Deshpande* 5, DD) has been collected from Jagdalpur, Bastar in south Madhya Pradesh, a new locality for this taxon hitherto unknown within India. Apart from India, this species is also widely distributed in N. and N. E. Australia, Borneo, S. China, Formosa, Japan, W. Java, Lesser Sunda Islands, Malay Peninsula, Moluccas, New Caledonia, New Guinea and Philippines at low altitudes up to 500 m.

As *S. rugosa* R. Br. is a new and interesting record to India, a full description together with synonymies follows :

Scleria rugosa R. Br. Prodr. Fl. Nov. Holl. 240, 1810; Kunth, En. Pl. 2 : 358, 1837; Steud. Syn. Pl. Glum. 2 : 179, 1855; S. T. Blake, J. Arnold Arb. 35 : 226, 1954; Kern, Blumea, 9 : 206, 1961 *et* *Adansonia*, 108, 1962; *S. lateriflora* Boeck., *Linnaea*, 38 : 455, 1874; *S. flaccida* C. B. Clarke, in Hook. f. Fl. Br. Ind. 6 : 688, 1894, *non* Steud. (1855); J. Linn. Soc. Bot. 34 : 98, 1898 *et* Ill. Cyp. t. 127, f. 3-5, 1909; *S. zeylanica* (non Poir.) C. B. Clarke in Hook. f. Fl. Br. Ind. 6 : 687, 1894, *excl. syn.* *S. thwaitesiana* Boeck. *et* *S. lateriflora* Boeck.; J. Linn. Soc. Bot. 34 : 98, 1898.—Figs. a-f.

Annual, monoecious. *Roots* purplish red. *Culms* many, tufted, slender, triquetrous, tripterous, obliquely ascending, hispid and leafy

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Scleria rugosa R. Br.

a. Habit $\times \frac{1}{2}$; b. Node with contraligule $\times 1\frac{1}{2}$; c. Nut $\times 12$; d. Nut (seen from below) $\times 13$; e. Nut $\times 12$; f. Nut (seen from below) $\times 14$. (From Deshpande 5, DD).